## REMARKS

This Amendment responds to the Office Action mailed July 24, 2003, in which the Examiner considered the Appeal Brief filed May 16, 2003 and, as a result, re-opened prosecution on the merits. No new matter is believed to be added to the application by this Amendment.

### Status of the Claims

Claims 4-30 are pending in the application. Support for claim 29 can be found at page 18, lines 2-3 of the specification. Support for claim 30 can be found in claim 1 and at page 6, lines 15-22 of the specification.

### Rejection Under 35 U.S.C. §102(b) Over Soma ( Paragraphs 2-3 of the Office Action)

Claims 4, 10-13, 21, 24, 27 and 28 are rejected under 35 U.S.C. §102(b) as being anticipated by Soma (U.S. Patent 5,411,767). Applicants traverse.

The present invention pertains to a solid electrolyte fuel battery. The invention's technology finds a typical embodiment in instant claim 4, which sets forth:

> 4. A solid electrolyte fuel battery, in which a sintered interconnector is used for connecting cells of the solid electrolyte fuel battery, and the sintered interconnector comprises a material having a matrix of the general formula $MTiO_3$ where M is Mg, Ca, Sr, or Ba.

The inventive sintered $MTiO_3$ matrix can be easily burned and has a small difference in expansion between oxidizing conditions and reducing conditions when used as a fuel cell interconnector. The resulting solid electrolyte fuel battery has excellent durability and reliability, and the battery can be easily produced. See page 5, lines 16-23 of the specification.

Sintering provides important advantages to the invention. The claimed solid electrolyte fuel battery may be produced using ordinary manufacturing methods such as dipping, coating, slip casting or printing.

Sintering represents one of several discrete alternative methods of forming the interconnector. This is discussed at page 6, lines 15-22 of the specification, which states:

> The interconnector of the invention can be sintered at a low temperature. Thus, a solid electrolyte type fuel battery can be produced by an ordinary manufacturing method using a ceramic slurry, such as dipping coating, slip casting, or printing. The fuel battery can also be produced by the thermal spraying method that uses a powdery staring material, or by vacuum evaporation of raw materials other than oxides.

Soma pertains to a method for producing an interconnector for a solid electrolyte type fuel cell. The Abstract of Soma states: "An interconnector material such as a perovskite complexed oxide is thermally sprayed onto the surface of an electrode of a solid electrolyte type fuel cell by plasma thermal spraying process at a temperature of not lower than 1,250 °C."

Soma fails to teach or suggest a "sintered interconnector" such as is set forth in claim 4.

As noted at page 17 of the Appeal Brief filed May 16, 2003, the Examiner has inferred that two discrete steps are needed in Soma to form the material. The present invention, in contrast, requires only one step: sintering. The Examiner has therefore 1) verified that Soma uses a fundamentally different process than that of the invention, or 2) the principal of operation must be changed.

At page 7, lines 1-5 of the Office Action mailed July 24, 2003, the Examiner responds:

> In response, it is agreed that Soma teaches that two discrete steps are needed to form the material: plasma spraying and sintering. However, the present invention, as claimed, is not limited only to a 'sintering' step. The claims are open-ended and may include process steps other than sintering. Thus the claims to note exclude the plasma spraying step of Soma.

The processes of "sintering" and "heat treatment" are however fundamentally different and do not represent equivalent art.

Soma does disclose an interconnector that is formed by plasma spraying followed by a heat treatment. See, e.g., Soma at column 2, lines 10-16. However, an interconnector formed by such a process would have substantial differences when compared to an inventive interconnector.

One having ordinary skill would recognize that "heat treatment" is a process that carries out an adjustment of the crystalline structure of the particles. In contrast, "sintering" is a process that makes a tight bond between particles.

Thus, there might be an example where the interconnector is formed by "plasma spraying," and the interconnector is treated with heat sometime later. However, one having ordinary skill would recognize that it is practically non-existent to carry out "plasma spraying" and "heat treatment" in a concurrent manner. That is, if the two steps were carried out concurrently, it would be meaningless to carry out the plasma spraying.

Claim 4, as a result, has clearly been neither anticipated nor suggested by Soma. Claims dependent upon claim 4 are patentable for at least the above reasons alone. This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

**Rejection Under 35 U.S.C. §103(a) Over Soma (Paragraph 4 of the Office Action)**

Claims 6, 8, 14-17, 22, 23, 25 and 26 are rejected under 35 U.S.C. §103(a) as being obvious over Soma. Applicants traverse.

The inability of Soma to suggest the present invention has been discussed above. In making this rejection, the Examiner (at page 3, lines 17-18 of the Office Action) admits to additional failings of Soma where "[the] reference does not

expressly teach the same or overlapping subscript ranges for the $(La_{1-x}D_x)_{1-u}B_{1-w}O_3$ compounds as recited in claims in 6, 8, 14 and 16."

The Examiner has nonetheless alleged obviousness over Soma not by combining references, but over a single reference. To establish a *prima facie* case of obviousness, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP §2142. In addition, if a reference needs to be modified to achieve the claimed invention "there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion." Sibia Neurosciences Inc. v. Cadus Pharmaceutical Corp., 225 F. 3d 1349, 1356, 55 USPQ2d 1927, 1931 (Fed. Cir. 2000). As a result, the Examiner has failed to show how Soma teaches or suggests all the claim limitations.

A person having ordinary skill would therefore not be motivated by the single reference of Soma to produce a claimed embodiment of the invention. A *prima facie* case of obviousness has thus not been made over Soma.

This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

**Rejection Under 35 U.S.C. §103(a) Over JP '913 In View Of Soma (Paragraph 5 of the Office Action)**

Claims 4-28 are rejected under 35 U.S.C. §103(a) as being obvious over JP '913 (JP 8-50913) in view of Soma. Applicants traverse.

Distinctions of the Invention of JP '913 and Soma are of record in the application.

JP '913 pertains to a solid electrolyte type fuel cell in which the air electrode and the interconnector can be simultaneously molded. JP '913 fails to disclose the material of the interconnector. The Examiner admits this failure in paragraph 3 of Paper No. 24 (Office Action dated July 16, 2002).

In the conventional fuel battery shown in Figs. 5 and 6 of JP '913, a solid electrolyte layer 14 is formed at the outer circumference of the cylinder-shaped air electrode 13, and a fuel electrode is formed on the outer frame of the solid electrolyte layer 14. Fig. 1 of JP '913 shows an interconnector 24 molded to a part of the cylinder portion of the air electrode that concurrently acts as a support tube. Although this structure may achieve a small-size, lightweight fuel battery, the JP '913 reference merely discloses the feature of integrally sintering electrodes in the manufacturing process of the fuel battery.

The Examiner then turns to the teachings of Soma for the materials of the interconnector. However, the inability of the thermal spraying technology of Soma to be utilized to allege *prima facie* obviousness has been discussed above and in previous responses.

The Examiner uses the teachings of Soma for material components. The Examiner, however, fails to realize that Soma represents a fundamentally different thermal spraying technology. A prior art reference is analogous if the reference is in

the field of Applicants' endeavor or, if not, the reference is reasonably pertinent to the particular problem with which the inventor was concerned.

"In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with the which the inventor was concerned." In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

The field of endeavor of Soma, in contrast, is thermal spraying, which is in marked contrast to the sintering of the present invention. Soma is thus non-analogous art. As a result, the Examiner has relied upon impermissible hindsight reconstruction, discussed above, to combine Soma with JP '913.

A case of *prima facie* obviousness has thus not been made over JP '913 in view of Soma. This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

**Unexpected Results**

Even if it is assumed *arguendo*, that prima facie obviousness can be alleged over Soma or the combination of JP '913 with Soma, this obviousness would be fully rebutted by the three showings of unexpected results submitted as Declarations Under 37 C.F.R. §1.132. These declarations have been discussed in

detail, for example, at pages 14-18 of the Appeal Brief filed May 16, 2003. For, brevity, this entire discussion is not repeated here.

However, the Examiner is respectfully requested to reconsider the results in light of the instant claims. The unexpected results of the invention are typified in the first Declaration on February 12, 2002. The first Declaration clearly describes the inventive process of sintering compared to the Soma-type thermal spraying process. The appendices to this first Declaration included overheads describing the sintering process and two publications pertaining to plasma spraying. The Declaration use $LaCrO_3$ as the exemplary material. Comparative results between sintering and thermal spraying were summarized in a table, which is reproduced as Table 1, below.

Table 1. Comparison of thermal spraying and sintering in fuel cell preparation.

| | Fuel Cell Prepared by Thermal Spraying Process | Fuel Cell Prepared by Sintering Process (Present Invention) |
|---|---|---|
| Required time for production | 150 min/fuel cell | 15 min/fuel cell |
| Yield on materials | 3 - 10% | 90% or more |
| Equipment cost | Basic Amount | 1/10 |
| Construction Cost | Basic Amount | 1/5 |
| Materials Cost | Basic Amount | 1/2 |
| Cell production cost | 1/3 million yen/kw | 50,000 yen/kw |

Despite the clear advantages of the invention, the Examiner did not allow the application.

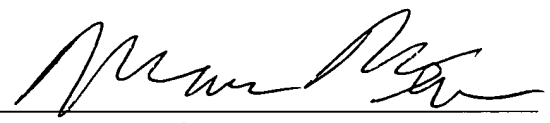
**Conclusion**

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
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